

## PATENT SPECIFICATION

588,599



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## PROVISIONAL SPECIFICATION

## Improvements in Tools for Forming Tapped Holes in Workpieces

I, GEORGE EDWARD NEWARD, a Subject of the King of Great Britain, of Vine Cottage, Woodhill Road, Sandon, Nr. Chelmsford, Essex, do hereby declare the nature of this invention to be as follows:—

This invention relates to tools for forming tapped holes in workpieces, and has for an object to provide a tool which will enable a hole to be drilled and tapped in a single operation.

According to the present invention, a tool having a shank part for insertion into a chuck or like gripping device has a tap formed on one end of the shank, said tap formation terminating at the leading end in a twist drill of the appropriate size for cutting the hole to be tapped.

Preferably the drill part and the tap part of the tool have the same number of flutes, and the tap part is tapered for a suitable distance back from the point where it merges with the twist drill part.

The invention also envisages the combination with a tool as described in the two preceding paragraphs of a jig comprising a guide bush formed with a through hole of a diameter to receive the twist drill part of the tool, said bush being split along one or more planes containing the axis of the hole, and releasable means for locking the several parts of the bush in register.

Conveniently the parts of the bush are resiliently urged apart, and they may be constituted by jaws pivoted together or to a common yoke.

Advantageously, a part of the bush, or a yoke or carrier with which it is connected, is provided with means for accurately locating on the workpiece the through hole in the bush.

In order that the invention may be more clearly understood, one embodiment thereof will now be described by way of example only.

The drilling and tapping tool consists of a cylindrical stock formed at one end into a shank or tang having any convenient shape, such as a Morse taper, for engagement with a chuck or tap-holder. Over the first part of its length, adja-

cent the shank, the stock is machined to present the usual kind of tap formation having two oppositely located straight-flutes, the lands at the leading end being progressively reduced in radial height, in known manner, to provide a lead-in taper which facilitates the starting of the thread-cutting operation.

Over the remainder of its length, the cylindrical stock is formed into a twist drill adapted to cut a hole of the diameter appropriate for the size of the tap. The stock is suitably machined to ensure that the tap part merges smoothly into the drill part so as to avoid any high local stresses being set up in the tool when the tap part enters the hole already formed by the drill part.

It may be arranged that the tap part is provided with three flutes whilst the drill part has the normal two flutes.

In order to facilitate jig drilling, a jig is provided comprising a guide bush or block in which a through hole is formed of such diameter as to allow the drill part to pass therethrough with the necessary working clearance. The guide bush or block is split in a plane containing the axis of the hole to provide a pair of jaws; each jaw being pivoted at one end on a carrier plate in which is formed a hole coaxial with the guide hole but of greater diameter to allow the tap part of the tool to pass therethrough.

A tension spring is stretched around the pivoted ends of the jaws and anchored at each end to a pin on the outer face of the respective jaw, the action of this spring being to urge the jaws to separate by swinging about their pivots, so parting the two flanks of the guide hole and leaving the jaws well clear of the tap part of the tool when the latter passes through the hole in the carrier plate.

The free ends of the jaws are provided with complementary ridge formations which can be engaged by a catch pivoted on the carrier plate. The catch is in the form of a yoke having short lugs at each end, which are spaced so as to embrace closely the outer flanks of the complementary ridge formations on the jaws when the latter are in their closed

(operative) positions. The flanks of the ridge may be slightly inclined to provide a wedging action as on the lugs on the yoke are engaged therewith.

- 5 In order to afford additional rigidity to the pivot of the jaws, a bridge piece is mounted over their free ends.

In use, the carrier plate is located on the workpiece, and the jaws are pressed 10 together and clamped by the yoke catch.

The drill part of the tool is inserted into the guide hole and drilling is commenced. As the tap part approaches the jaws, the catch is released and the jaws fly apart, leaving ample clearance for the tool to continue penetrating the work. The catch may be released by hand, or it may be automatically tripped by a limit stop which engages, say, the chuck or any 15 other convenient part of the tool or its holder.

In a modified form of jig, the jaws are mounted on a common pivot pin and are urged apart by a spiral or helical spring mounted around the free end of the pin 25 and having its ends turned down to enter holes in the top faces of the jaws. A locking arm is also pivoted on the pin and is provided with a hook-like end which engages with the yoke catch to retain it 30 in the clamping position.

Instead of pivoted jaws, the guide bush or block may be split into sliding parts which are resiliently urged apart, the yoke catch being suitably modified 35 accordingly.

Dated this 20th day of November, 1945.

For the Applicant,

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#### COMPLETE SPECIFICATION

#### Improvements in Tools for Forming Tapped Holes in Workpieces

I, GEORGE EDWARD NEVARD, a Subject of the King of Great Britain, of Vine Cottage, Woodhill Road, Sandon, Nr. 40 Chelmsford, Essex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

45 This invention relates to tools for forming tapped holes in workpieces, and has for an object to provide a tool which will enable a hole to be drilled and tapped in a single operation.

50 According to the present invention, a tool having a shank part for insertion into a chuck or like gripping device has a tap formed on one end of the shank, said tap formation terminating at the 55 leading end in a twist drill of the appropriate size for cutting the hole to be tapped.

Preferably the drill part and the tap part of the tool have the same number of 60 flutes, and the tap part is tapered for a suitable distance back from the point where it merges with the twist drill part.

The invention also envisages the combination with a tool as described in the 65 two preceding paragraphs of a jig comprising a guide bush formed with a through hole of a diameter to receive the twist drill part of the tool, said bush being split along one or more planes containing the axis of the hole, and releasing means for locking the several parts of the bush in register.

Conveniently the parts of the bush are

resiliently urged apart, and they may be constituted by jaws pivoted together or 70 to a common yoke.

Advantageously, a part, such as a yoke or carrier with which the bush is connected, is provided with means for accurately locating on the workpiece the 80 through hole in the bush.

In order that the invention may be more clearly understood, one embodiment thereof will now be described by way of example only, and with reference to the 85 accompanying drawings in which:—

Fig. 1 illustrates a composite drill and tap;

Fig. 2 is a plan of a split bush jig with the jaws open;

Fig. 3 shows the jig of Fig. 2 with the jaws closed;

Fig. 4 is a perspective view of the jig shown in Figs. 2 and 3;

Fig. 5 is an end elevation of another 90 form of jig with the jaws closed;

Fig. 6 is a side elevation of the jig shown in Fig. 6;

Fig. 7 is a perspective view of the jig shown in Fig. 5.

The drilling and tapping tool shown in Figure 1, consists of a cylindrical stock formed at one end into a shank 1 terminating in a tang 2 for engagement with a tap-holder. Over the first part of its 105 length, adjacent the shank 1, the stock is machined to present the usual kind of tap formation 3 having two oppositely located straight flutes 4, the lands at the leading end 3a being progressively 110

reduced in radial height, in known manner, to provide a lead-in taper which facilitates the starting of the thread-cutting operation.

5 Over the remainder of its length, the cylindrical stock is formed into a twist drill 5 adapted to cut a hole of the diameter appropriate for the size of the tap 3. The stock is suitably machined to ensure that the tap part 3 merges smoothly into the drill part 5 so as to avoid any high local stresses being set up in the tool when the tap part enters the hole already formed by the drill part.

10 It may be arranged that the tap part 3 is provided with three flutes whilst the drill part has the normal two flutes.

In order to facilitate drilling, a jig is provided. The jig shown in Figs. 2-4 comprises a guide bush or block split in a plane containing the axis of the hole to be drilled to present a pair of jaws 6, each jaw being pivoted at 7 on a carrier plate 8 in which is formed a hole 9. This 25 hole is coaxial with a guide hole 10 formed half in each jaw 6 and of such diameter as to allow the drill part 5 to pass therethrough with the necessary working clearance. The hole 9 is of greater 30 diameter than the guide hole 10 to allow the tap part 3 of the tool to pass therethrough.

A tension spring 11 is stretched around the pivoted ends of the jaws 6 and anchored at each end to a pin 12 on the outer face of the respective jaw, the action of this spring being to urge the jaws 6 to separate by swinging about their pivots 7, so parting the two flanks of the guide hole 10 and leaving the jaws 6 well clear of the tap part 3 of the tool when the latter passes through the hole 9 in the carrier plate 8.

The free ends of the jaws are provided 45 with complementary ridge formations 13 which can be engaged by a catch 14 pivoted on the carrier plate 8. The catch 14 is in the form of a yoke having short lugs 15 at each end which are spaced so 50 as to embrace closely the outer flanks of the complementary ridge formations 13 on the jaws 6 when the latter are in their closed (operative) positions (Figs. 3 and 4). The flanks of the ridges 13 may be 55 slightly inclined at 13 $\alpha$  to provide a wedging action as the lugs 15 on the yoke are engaged therewith.

In order to afford additional rigidity to the pivots 7 of the jaws, a bridge piece 60 16 is mounted over their free ends.

In use, the carrier plate 8 is located on the work-piece, for example by pins or keys (not shown) formed thereon or secured thereto which register with complementary recesses in the work, and the 65

jaws 6 are pressed together and clamped by the catch 14. The drill part 5 of the tool is inserted into the guide hole 10 and drilling is commenced. As the tap part 3 approaches the jaws 6, the catch 14 is released and the jaws 6, fly apart, leaving ample clearance for the tool to continue penetrating the work. The catch 14 may be released by hand, or it may be automatically tripped by a limit stop 75 which engages say, the chuck or any other convenient part of the tool or its holder, and may be spring loaded.

In the modified form of jig, shown in Figs. 5, 6 and 7, the jaws 6 are mounted on a common pivot pin 17 and are urged apart by a helical spring 18 mounted around the free end of the pin 17 and having its ends 19 turned down to enter holes in the top faces of the jaws 6. A locking arm 20 is also pivoted on the pin 17 and is provided with a hook-like end 21 which engages with the arm of the yoke catch 14 to retain it in the clamping position. The side faces 13b of the ridges 13 are tapered downwards and outwards. A register bush 8a is also formed on the under side of the plate 8 to register with holes in a master jig where a plurality of tapped holes have to be formed in the work.

Instead of pivoted jaws, the guide bush or block may be split into sliding parts which are resiliently urged apart, the yoke catch being suitably modified accordingly.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A tool, having a shank part for insertion into a chuck or like gripping device and having a tap formed on one end of the shank, said tap formation terminating at the leading end in a twist drill of the appropriate size for cutting the hole to be tapped.

2. A tool according to claim 1, where-  
in the drill part and tap part have the  
same number of flutes, and the tap part  
is tapered for a suitable distance back  
from the point where it merges with the  
drill part.

3. The combination with a tool accord-  
ing to claim 1 or 2, of a jig comprising a  
guide bush formed with a through hole  
of a diameter to receive the drill part  
of the tool, said bush being split along  
one or more planes parallel to or contain-  
ing the axis of the hole, and releasable  
means for locking the several parts in  
register.

4. The combination according to claim  
3 wherein the parts of the bush are resi- 120  
125  
130

lently urged apart.

5. The combination according to claim 3 or 4 wherein the parts of the bush are constituted by pivoted jaws.

6. The combination according to claim 3, 4 or 5 wherein a part, such as a yoke or carrier with which the bush is connected is provided with means for

10 accurately locating on the workpiece the through hole in the bush.

7. A tool for forming tapped holes in workpieces substantially as described and as shown in Fig. 1 of the accompanying

drawings.

8. The combination with a tool for 15 forming tapped holes in workpieces of a jig constructed and arranged to operate substantially as described and as shown in Figs. 2-4 of Figs. 5-7 of the accompanying drawings.

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Dated this 18th day of November, 1946.

For the Applicant,

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75, Victoria Street, London, S.W.1,  
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copies, price 1s. 0d. each (inland) 1s. Id. (abroad) may be obtained.

## 588,599 COMPLETE SPECIFICATION

1 SHEET

*[This Drawing is a reproduction of the Original on a reduced scale.]*